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<sup>6</sup> **SUCCESS CHANCES OF RECRUITS  
ENTERING THE NAVY (SCREEN)**

**CENTER FOR NAVAL ANALYSES**

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Institute of Naval Studies

<sup>10</sup> By: **Robert F. Lockman**

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Success Chances of REcruits Entering the Navy (SCREEN) are validated and extended from the first through the second year of service. Selection rates and predicted one- and two-year loss rates at different SCREEN cutting scores are calculated for recruitment planning. Inconsistencies in AFQT mental group measurement and irregularities in AFQT test administration since 1973 are pointed out. A conversion of AFQT scores derived from the current Armed Services Vocational Apti-		

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20 tude Battery (ASVAB) to the mental groups used in SCREEN is provided, along with revised SCREEN chances for ASVAB mental groups. ←

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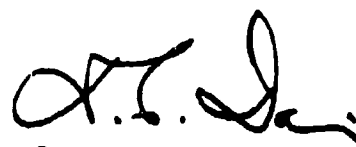
1. The Enlisted Tracking Study was originally commissioned to develop a technique for estimating premature losses that could be used to plan recruiting policy and screen applicants for enlistment. A table of estimated chances of surviving the first year of service, called SCREEN, was produced by the study. Enclosure (1) reports on a test of SCREEN on a new cohort of non-prior service recruits and an extension of SCREEN through two years of service. It discusses problems in deriving AFQT mental groups from the Armed Services Vocational Aptitude Battery (ASVAB) that replaced the Navy Basic Test Battery (BTB) on 1 January 1976.

2. The first year SCREEN correlated highly with actual survival rates of a new cohort of recruits, but tended to overestimate the chances of very low quality recruits. The two-year SCREEN correlated very highly with the first-year SCREEN and showed even greater success chances of high school graduates with below average mental ability over non-graduates with above average mental ability. Inconsistencies and shifting standards in AFQT mental group measurement have occurred since 1973, and a conversion of mental groups derived from ASVAB to those derived from the BTB used in SCREEN is provided to partly offset them. Irregularities in test administration and norming have also occurred, but these can be offset only by the careful monitoring of applicant testing and proper norming of AFQT scores to maintain quality control.

3. SCREEN is based only on pre-service characteristics and mental groups. Navy training, assignments, and performance factors should also be considered in relation to first-term success chances. The importance of these latter factors to retention is being examined in the Recruiting, Retention, and Reenlistment Study.

4. Enclosure (1) is forwarded.

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## SUMMARY

### INTRODUCTION

Success Chances of Recruits Entering the Navy (SCREEN) were developed on 67,000 non-prior service males who joined the regular Navy in CY 1973, the first year of the all-volunteer force (reference 1). SCREEN predicts the chances of completing the first year of service in relation to education, mental group, age, race, and dependent status. It was adopted by the Navy for use in recruit screening and recruitment planning on 1 October 1976 (reference 2).

In this report, SCREEN is validated on a new cohort of recruits who entered the Navy in CY 1974, and extended through the first two years of service for the original cohort. A detailed investigation of the effects of different mental groups and educational levels on success chances is made. Finally, the relation of AFQT mental groups from the current Armed Services Vocational Aptitude Battery (ASVAB) to those from the Basic Test Battery (BTB) used in SCREEN is described.

### FINDINGS

SCREEN prediction equations were tested on a new cohort of recruits who entered the Navy in CY 1974, a period of very high recruiting quotas. The estimated chances of completing the first year of service for high school graduates and men in the upper mental groups agreed closely with actual results from the CY 1974 cohort. The estimated chances of recruits with the least education and mental ability were overestimated. There was a large influx of men with less than 12 years of education in CY 1974 (37 percent), and their reported mental groups turned out to be higher than they should have been.

SCREEN chances of completing two years of service showed an increased success advantage of high school graduates over non-graduates and men with GED high school equivalencies. High school graduates of below average mental ability had even markedly higher success rates by the end of two years of service than non-graduates of above average mental ability. This was true for both Caucasians and non-Caucasians. For both racial groups, the second year loss rate for graduates was about half that of non-graduates. Although race was associated with first year success chances for the CY 1973 cohort, it dropped out of the picture by the end of the second year of service and was not related to first year success chances for the CY 1974 cohort. Success chances of men with GED high school equivalencies were lower than those of graduates, but higher than those of non-graduates. A table of selection rates and predicted loss rates for different SCREEN cutting scores was calculated for use in recruitment planning.

Changes in AFQT tests from (1) the original AFQT to (2) the Short Basic Test Battery to (3) the Basic Test Battery (BTB) to (4) the Armed Services Vocational Aptitude Battery (ASVAB) have shifted standards of mental group measurement. In addition, improper and inconsistent norming of AFQT scores also occurred. A comparison of ASVAB and BTB AFQT mental groups revealed that those derived from the ASVAB are less stringent than the ones based on the BTB and used in SCREEN. This results in overestimates of success chances. Adjustments to the mental groups in the SCREEN tables were made to correct for this overestimation, and revised success chances were computed for recruit quality groups based on the ASVAB mental groups. However, these steps cannot compensate for the effects of testing irregularities and test compromise.

Further SCREEN research is looking at the effects of service experience on premature loss rates. If certain patterns of training, assignment, performance, and ratings are related to continuation, an in-service SCREEN can be devised to capitalize on these patterns for use in enlisted classification, distribution, and separation policy.

Meanwhile, closer technical and administrative monitoring of the whole ASVAB operation is imperative if chronic problems with enlisted selection testing are to be avoided. The ASVAB is an inter-service enterprise subject to individual service pressures, but even when the Navy controlled its own selection testing, problems like those encountered with the ASVAB occurred.

## ANALYSIS

### SCREEN VALIDATION

SCREEN predicted chances of completing the first year of service were compared with the actual first year completion rates for a new cohort of recruits to test their validity. The predicted success rates, shown in tables 1 and 2 for linear and logit regression models, came from the study of recruits who entered the Navy in CY 1973 (reference 1). The actual rates were those of similarly grouped recruits who joined the Navy in CY 1974.

#### Test Cohort

Comparative statistics on accessions and losses for the CY 1973 base and CY 1974 test cohort are shown in table 2. The first year loss rate rose from 17 percent in 1973 to 22 percent in 1974, a year when non-prior-service male accessions increased by nearly 25 percent (67,000 to 83,000). For both cohorts, the most striking individual loss rates were for men with less than 12 years of education and mental group IVa. Mental group was recalculated from the GCT, Arithmetic, and Mechanical tests (G+A+M) of the Basic Test Battery - Form 7 administered in recruit training, since it was badly inflated when based on the Short BTB administered by recruiters in the field during 1973 and 1974.

For the CY 1974 cohort, reported and recalculated mental group distributions are given below:

<u>Mental Group</u>	<u>Reported (SBTB)</u>	<u>Recalculated (BTB-7)</u>
I	2%	4%
II	31	29
IIIU	26	21
IIIL	32	20
IV	9	26

The change in the lowest mental group is striking, even more pronounced than it was in the CY 1973 cohort when a similar correction was made.

The CY 1974 recruits were divided into the same groups as were their CY 1973 counterparts, a possible total of 180 groups defined by all possible combinations of these predictors:

Education	>12 years
	12
	<12

TABLE 1

FIRST YEAR SCREEN  
Linear Model

NON-CAUCASIAN									
		>12	12	>12	12	<12		>12	<12
		NO DEPS		DEPENDENTS		NO DEPS		DEPS	
I	18-19	99	96	99	98	95	88	99	84
	17	97	94	93	97	94	87	99	83
	20+	96	92	92	95	92	85	99	83
II	18-19	94	91	90	93	90	83	97	79
	17	92	89	89	92	90	82	96	78
	20+	91	88	87	90	87	80	94	76
III	18-19	91	88	87	91	88	80	95	77
	17	90	87	86	89	86	79	93	75
	20+	88	85	84	88	85	77	91	73
III	18-19	86	83	82	86	83	75	89	71
	17	85	81	81	84	81	74	88	70
	20+	83	80	79	82	79	72	86	68
IV	18-19	81	78	77	81	78	70	85	67
	17	80	77	76	79	76	69	83	65
	20+	78	75	74	78	75	67	81	63

Source: reference 1.

TABLE 1 (Cont'd)

Logit Model

Years of education: AGE		Caucasian						Non-Caucasian					
		>12			<12			>12			<12		
		No	Depts	12	No	Depts	12	No	Depts	12	No	Depts	12
95-99	18-19	96	95	95	95	93	91	87	97	96	95	94	92
	17	96	95	94	92	90	86	86	96	95	95	93	91
	20+	95	94	93	91	88	83	83	96	94	94	92	89
67-94	18-19	93	90	90	86	82	76	93	91	91	88	84	78
	17	92	89	89	85	81	74	93	91	90	87	83	76
	20+	91	88	87	83	78	70	92	89	88	84	80	73
50-66	18-19	91	88	87	83	78	71	92	89	88	85	80	73
	17	90	87	86	82	77	69	91	88	87	83	79	71
	20+	88	85	83	79	73	65	89	86	85	81	75	67
34-49	18-19	87	83	82	77	71	63	89	85	84	79	74	65
	17	86	82	81	76	69	61	88	84	83	78	72	63
	20+	84	79	78	72	65	56	85	81	80	74	68	59
21-34	18-19	84	80	79	73	66	57	86	82	81	75	69	60
	17	83	78	77	71	64	55	85	80	79	73	67	58
	20+	80	75	74	67	60	50	82	77	76	70	63	53

TABLE 2

CY 1973 AND CY 1974 ACCESSION AND LOSS RATES  
BY PRE-SERVICE VARIABLES

		<u>% of accessions</u>		<u>1st year loss rate</u>	
		<u>CY 1973</u>	<u>CY 1974</u>	<u>CY 1973</u>	<u>CY 1974</u>
Education	>12 years	8	6	9.3%	10.7%
	12	63	57	13.2	15.2
	<12	29	37	28.3	34.9
Age	17	28	28	22.5	29.2
	18 & 19	55	51	14.8	18.8
	20+	17	21	16.4	20.8
Mental Group	I	4	4	5.0	5.2
	II	36	29	11.3	13.0
	III U	24	20	16.1	19.9
	III L	19	20	23.1	28.1
	IV	17	27	28.1	32.5
Race	Caucasian	89	86	16.9	21.7
	Non-Caucasian	11	14	20.3	25.4
Dependents	No	94	93	16.9	22.0
	Yes	6	7	21.8	25.7
Total		--	--	17.2	22.2
Number		66,680	82,698	11,498	18,366

Mental group	I
	II
	IIIU
	IIIL
	IV
Age	17
	18 & 19
	20 & above
Race	Caucasian
	Non-Caucasian
Primary dependents	No
	Yes

Out of the 180 possible groups, 152 contained recruits. The actual data for both 1973 and 1974 is in appendix A. The methodology and models are described in detail in appendix B.

#### Predicted And Actual Success Rates

Weighted linear and logit regressions (reference 1) were run on the 152 groups of recruits using the predictor variables listed above and CY 1974 first year loss rates. The linear results appear in table 3, along with parallel CY 1973 results. For both cohorts, the regression coefficients and other statistics are similar with two exceptions: in 1974 primary dependents was not a significant predictor, and the race variable declined in significance to the 10 percent level.

First year success rates predicted from equations developed on 1973 data were correlated with the actual rates in 1974 for the 152 groups. The data was weighted as in the original analysis, since the groups varied in size from 1 to over 10,000 men (see appendix B). For the logit model, the correlation was .95; for the linear, .94.

Even though the SCREEN predicted rates correlate very highly with actual rates in another cohort, this does not necessarily mean that the two are identical. Further, CY 1974 was marked by substantially larger recruiting goals, and quality standards were diminished to meet them.

A group by group comparison of CY 1974 success rates with SCREEN linear predicted rates for the 27 groups that contained at least 1 percent each of the 83,000-man cohort is presented in table 4. The 27 groups contain 82 percent of the cohort. The average difference between the predicted and actual rates is 2.8 percentage points.



TABLE 3

WEIGHTED LINEAR REGRESSION RESULTS FOR CY 1973  
AND CY 1974 FIRST YEAR LOSS MODELS

Explanatory Variable	CY 1973			CY 1974		
	Coeff.	t	rp	Coeff.	t	rp
Constant	.118	26.89	--	.121	19.73	--
<12 yrs. educ.	.111	19.03	.85	.158	23.44	.92
MG IV	.100	13.44	.75	.098	11.93	.76
MG I	-.078	-10.85	-.68	-.090	-9.75	-.70
MG III L	.052	7.91	.56	.054	6.59	.55
Age 20+	.032	5.43	.42	.052	7.50	.60
MG II	-.026	-5.28	-.41	-.030	-4.49	-.41
Non-Caucasian	-.034	-4.89	-.39	-.013	-1.60	-.16
>12 yrs. educ.	-.031	-4.49	-.36	-.039	-4.31	-.40
Dependents	.038	4.36	.35	--	--	--
Age 17	.015	2.89	.24	.023	3.38	.32
Age 19	--	--	--	.019	2.83	.27
$R^2$		.927			.953	
Standard error		.023			.025	
F (df)		167.600 (10,137)			199.563 (10,99)	

Note: Coefficient is the partial regression coefficient; t is Student's t-statistic;  $r_p$  is the partial correlation coefficient;  $R^2$  is the squared multiple correlation coefficient; F is the F-test with df being its associated degrees of freedom.

TABLE 4  
ACTUAL AND PREDICTED SUCCESS CHANCES  
FOR SELECTED CY 1974 GROUPS

<u>MG</u>	<u>Educ.</u>	<u>Age</u>	<u>No. of Recruits</u>	<u>Actual</u>	<u>Predicted</u>	<u>Diff.</u>
I	12 yrs.	18 & 19	1,281	95	96	+1
II	>12	20+	1,485	89	91	+2
	12	18 & 19	10,742	90	91	+1
		17	2,691	88	89	+1
		20+	2,671	86	88	+2
		20+D	847	84	84	0
	<12	18 & 19	1,206	79	80	+1
		17	1,933	77	78	+1
IIIU	12	18 & 19	5,958	88	88	0
		17	1,419	85	87	+2
		20+	1,394	82	85	+3
	<12	18 & 19	1,901	72	77	+5
		17	3,335	71	76	+5
IIIL	12	16 & 19	3,821	85	83	-2
		20+	983	80	80	0
		17	873	80	81	+1
		18 & 19 N	848	82	86	+4
	<12	17	4,447	64	70	+6
		18 & 19	2,349	66	72	+6
IV	12	18 & 19 N	2,085	81	82	+1
		20+ N	1,009	76	78	+2
		18 & 19	3,472	76	78	+2
		20+	1,186	68	75	+7
	<12	18 & 19 N	1,141	66	70	+4
		17 N	973	63	69	+6
		18 & 19	2,835	61	67	+6
		17	4,970	59	66	+7

N = Non-Caucasian groups, D = dependents.

Differences averaging 4.7 points occurred for groups with less than 12 years of education in mental groups IIII and IV that made up 25 percent of the cohort: many of these men were neither high school graduates nor eligible for Navy schools. Differences averaging only 1.6 percentage points occurred for groups with 12 or more years of education that included 58 percent of the cohort.

#### Detailed Analysis Of Mental Groups And Education

Because of the overprediction of success chances for low quality recruits in CY 1974, mental groups and educational levels were divided into finer gradations to identify the locus of over-prediction more precisely. This involved using four levels of mental group III, two of mental group IV, and a mental group V. Where possible, these levels were chosen to include about 10 percent of the CY 1973 cohort. The G+A+M score limits and their corresponding APQT percentiles are shown below:

<u>Revised mental group</u>	<u>G+A+M</u>	<u>Percentile</u>
I	190+	93-99
II	161-189	65-92
IIIU A	154-160	56-64
IIIU B	148-153	49-55
IIIL C	143-147	43-48
IIIL D	136-142	32-42
IV A	125-135	21-31
IV B	107-124	10-20
V	1-106	1-9

The less than 12 year education category was broken into 11, and less than 11, year categories for use along with the 12, and greater than 12, year categories. The choice of years of education rather than high school graduation, GED equivalency, and non-graduation for use in SCREEN is discussed in appendix C, which also shows that the success chances of recruits with GED high school equivalencies lie between those of graduates and non-graduates.

Table 5 shows the CY 1973 and 1974 cohort inputs and first year loss rates for the redefined mental group and education variables, along with the age, race, and dependent variables used in SCREEN.

The loss rate increases as years of education decrease in both cohorts. But compared to CY 1973, there is a sizable inversion in the loss rates for mental groups IVA and IVB in CY 1974 that involves over 25 percent of the cohort.

With respect to recruit quality, CY 1974 was decidedly inferior to CY 1973: 71 percent had at least 12 years of education and 64 percent were school eligible in CY 1973,

TABLE 5

INPUTS AND LOSS RATES FOR CY 1973 AND CY 1974 COHORTS  
USING EXPANDED MENTAL GROUP AND EDUCATIONAL LEVELS

	CY 1973		CY 1974	
	<u>% input</u>	<u>Loss rate</u>	<u>% input</u>	<u>Loss rate</u>
Age 17	28.1	22.5	23.5	29.2
18 & 19	55.0	14.8	50.7	18.9
20	16.9	16.4	20.8	20.9
>12 yrs. educ.	7.9	9.3	5.8	10.7
12	63.3	13.2	57.3	15.2
11	13.6	26.0	18.1	31.5
<11	15.2	30.4	18.8	38.2
I	4.3	5.0	3.9	5.2
II	36.2	11.3	29.0	13.0
IIIU A	12.5	15.1	10.3	16.1
IIIU B	11.0	17.3	10.2	21.9
IIIL C	8.7	22.6	8.8	26.8
IIIL D	10.2	23.5	10.9	27.1
IV A	10.9	27.4	16.9	36.7
IV B	5.4	27.8	8.8	28.3
V	0.8	38.7	1.3	31.4
Caucasian	89.3	16.9	85.6	21.7
Non-Caucasian	10.7	20.3	14.4	25.4
No dependents	93.8	16.9	93.1	22.0
Dependents	6.2	21.8	6.9	25.7
Total	100.0	17.2	100.0	22.2
N	66,680		82,682	

whereas only 63 percent had at least 12 years of education and only 53 percent were school eligible in CY 1974.

The last step in this part of the analysis was a grouped logit regression analysis of the redefined variables to predict first year loss rates for each cohort. The results appear in table 6.

All variables were statistically significant at about the 1 percent level for the CY 1973 cohort. The non-Caucasian race variable was not significant for the CY 1974 cohort, where age 17 declined in significance to about the 10 percent level. Other notable decreases in predictive ability in CY 1974 were for mental groups IIIA and V, greater than 12 years of education, and dependents.

Thus, the pattern of recruit quality had declined sharply in CY 1974, a year of very high recruiting quotas. And the worst cases of underpredicting CY 1974 losses using the CY 1973 SCREEN were for men with 11 and less years of education and mental group IV, the source of the lower CY 1974 quality.

#### SCREEN FOR TWO YEARS OF SERVICE

Once two years had elapsed after the last man in the CY 1973 cohort joined the Navy, a SCREEN table for the two-year period was developed. Only pre-service and selection test variables were included, the same kinds used in developing the first year SCREEN.

The cumulative loss rate of the CY 1973 cohort after two years was 28 percent, compared to 17 percent at the end of the first year. Table 7 shows the loss rates for the individual predictors. The highest losses occurred among the men with less than 12 years of education and mental group IVs - just as they did at the end of the first year.

#### Two-Year Success Prediction

Weighted regression models like those used at the first year point were applied to the two-year data. The results are shown in table 8. The raw data appears in appendix D.

The race variable dropped out of the picture, since the difference between Caucasian and non-Caucasian was no longer significant when considered together with the other predictors. Both linear and logit models closely fitted the grouped data and produced very similar coefficients, t-statistics, and standard errors.

The success chances for both linear and logit regression models are given in table 9. Some differences appear in the table, notably for mental group I men with

TABLE 6  
WEIGHTED LOGIT REGRESSION RESULTS USING EXPANDED  
MENTAL GROUP AND EDUCATIONAL LEVELS

	CY 1973			CY 1974		
	Coeff.	t	r <sub>p</sub>	Coeff.	t	r <sub>p</sub>
Constant	-2.22	-80.55	-	-2.16	-64.10	-
MG I	-.72	- 7.04	-.36	-.67	- 5.69	-.29
III A	.20	4.59	.25	.13	2.32	.12
III B	.31	6.95	.36	.41	8.06	.40
III C	.61	13.36	.59	.62	11.88	.54
III D	.62	14.15	.61	.58	11.76	.54
IV A	.81	19.28	.73	1.01	23.51	.79
IV B	.87	16.38	.67	.75	14.60	.62
V	1.40	12.11	.55	.84	7.60	.38
Non-Caucasian	-.12	- 2.92	-.16	-.02	- 0.47	-.03
>12 yrs. ed.	-.30	- 4.83	-.26	-.25	- 3.28	-.18
11	.62	17.69	.70	.72	20.13	.74
<11	.78	22.06	.77	.99	26.56	.82
Age 17	.07	2.44	.13	.06	1.80	.10
Age 20+	.28	7.17	.37	.27	6.99	.35
Dependents	.42	8.38	.42	.28	5.33	.28
R <sup>2</sup>		.88			.89	
Standard error		.23			.25	
F (df)		156.91 (15,345)			174.88 (15,356)	

TABLE 7

CY 1973 COHORT LOSS RATES BY THE  
END OF TWO YEARS OF SERVICE

		<u>Two year loss rate</u>
Education	>12 years	14.8%
	12	21.8
	<12	45.2
Age	17	58.3
	18	23.8
	19	23.9
	20+	24.4
Mental group	I	11.2
	II	19.4
	III U	27.2
	III L	36.3
	IV	42.4
Race	Caucasian	27.3
	Non-Caucasian	34.3
Dependents	No	27.8
	Yes	31.6
Total		28.0
Number		18,681

less than 12 years of education. Even though linear and logit chances correlate very highly, the logit would be preferred on the grounds of statistical efficiency and accuracy of fit to the data.

TABLE 8  
WEIGHTED REGRESSION RESULTS FOR TWO-YEAR LOSS MODELS

	Linear			Logit		
	Coeff.	t	rp	Coeff.	t	rp
Constant	.191	42.28	--	-1.400	-54.61	--
<12 yrs. educ.	.174	32.49	.96	.788	33.27	.96
MG IV	.113	17.42	.87	.520	17.62	.87
MG I	-.095	-12.33	-.78	-.734	-11.30	-.73
Age 17	.056	10.70	.73	.283	11.03	.74
MG III L	.063	10.33	.72	.308	10.59	.73
>12 yrs. educ.	-.055	-8.05	-.63	-.380	-7.82	-.62
MG II	-.036	-7.54	-.61	-.239	-8.68	-.66
Age 20+	.042	7.01	.58	.235	7.04	.58
Dependents	.046	5.75	.50	.288	6.97	.58
Age 19	.015	3.05	.29	.074	2.52	.25
$R^2$	.978			.977		
Standard error	.019			.016 <sup>a</sup>		
F (df)	441.690 (10,98)			408.477 (10,98)		

<sup>a</sup>Computed from the constant  $\pm .103$ , the logit standard error.



TABLE 9

## CHANCES OF SURVIVING TWO YEARS OF SERVICE

Years of Education Age	Logit						Linear					
	>12			12			>12			12		
	No	Dep3	Dep1	No	Dep2	Dep2	No	Dep3	Dep3	No	Dep3	Dep3
I	18	53	50	39	86	79	96	91	90	86	73	68
	19	92	90	89	85	73	94	90	89	84	72	67
	20	91	88	87	83	75	92	87	86	82	69	64
	17	90	87	86	83	74	90	86	85	80	67	63
II	18	88	85	84	79	70	90	85	84	80	67	63
	19	88	84	83	78	69	88	84	83	78	66	61
	20	86	82	80	75	58	86	81	80	76	63	58
	17	85	81	80	74	57	84	80	79	74	62	57
III U	18	86	82	80	75	65	86	82	81	76	63	59
	19	85	81	79	74	63	85	80	79	75	62	57
	20	82	78	76	71	59	82	77	77	72	59	55
	17	82	77	75	70	58	81	76	75	71	58	53
III L	18	81	77	75	69	58	80	75	75	70	57	53
	19	80	75	73	67	56	79	74	73	68	56	51
	20	78	72	70	64	52	76	71	70	66	53	48
	17	77	71	69	63	51	74	70	69	64	52	47
IV	18	78	73	71	64	52	75	70	70	65	52	48
	19	77	71	69	63	50	74	69	68	63	51	46
	20	74	68	66	59	46	71	66	65	61	48	43
	17	73	67	65	58	45	69	65	64	59	47	42

Predicted two-year success rates by recruit quality categories are listed in table 10. Noteworthy here is the 9 percentage point higher success rate for category C compared to category B. In other words, high school graduates who were not school eligible (that is, not in mental groups I, II, or IIIU) had a markedly higher success rate than school eligibles who were non-graduates (there was a three percentage point difference in the same direction at the end of the first year). This implies that once school seats are filled by high school graduates, attention should focus more on C than B quality recruits if two-year success chances are important.

TABLE 10  
PREDICTED TWO-YEAR SUCCESS CHANCES BY QUALITY CATEGORY<sup>a</sup>

<u>Quality Category</u>	<u>Success Chances</u>	
	<u>Linear</u>	<u>Logit</u>
A (School eligible, HSG)	82.1	81.8
B (School eligible, non-HSG)	60.9	62.3
C (Non-school eligible, HSG)	70.2	70.7
D (Non-school eligible, non-HSG)	50.7	49.8
A + B (school eligible)	78.3	78.2
C + D (non-school eligible)	60.9	60.8
A + C (HSG)	79.0	78.9
B + D (non-HSG)	54.8	54.8
A + B + C	76.4	76.5
A+B+C+D	72.0	71.9

<sup>a</sup>Using BTB mental groups.

### Predicting Two-Year From One-Year Success Chances

Since the one- and two-year chances for the 67,000 men in the CY 1973 cohort correlated .99, we calculated linear equations to predict the two-year from the one-year chances.

The regression formula for this purpose is a function of the correlation and the SCREEN means and standard deviations:

$$\text{Predicted SCREEN 2} = r \frac{\sigma_{\text{SCREEN 2}}}{\sigma_{\text{SCREEN 1}}} (\text{SCREEN 1}) + \left( \overline{\text{SCREEN 2}} - r \frac{\sigma_{\text{SCREEN 2}}}{\sigma_{\text{SCREEN 1}}} \left( \overline{\text{SCREEN 1}} \right) \right)$$

For the linear and logit models, the statistics used in calculating the formula are:

	<u>Linear</u>	<u>Logit</u>
r	.991	.993
<u>SCREEN 1</u>	82.419	-1.657
<u>SCREEN 2</u>	69.029	- .874
$\sigma_{\text{SCREEN 1}}$	8.349	.603
$\sigma_{\text{SCREEN 2}}$	11.883	.597

The predicted logit SCREEN 2 equals .982 (logit SCREEN 1) plus .754. The result is in logarithmic form, so  $1/(1 \text{ plus } e^{-x})$  must be computed to get the predicted chances.

The predicted linear SCREEN 2 equals 1.410 (linear SCREEN 1) minus 47.195. Some examples of predicted SCREEN scores are:

	<u>Predicted SCREEN 2</u>	
<u>SCREEN 1 (Linear)</u>	<u>Linear</u>	<u>Logit</u>
72	54	53
77	61	61

TABLE 11  
PREDICTED RECRUIT INPUT AND LOSS RATES  
FOR DIFFERENT LINEAR SCREEN CUT SCORES

Cut score <sup>a</sup> Screen 1	Screen 2	Percent selected	Number selected from CY 73 cohort	Number of losses from CY 73 cohort		Loss rate	
				1st Year	2 Years	1 Year	2 Years
60	42	100.0	66,680	11,498	18,681	17.2	28.0
70	51	94.0	62,674	10,175	16,555	16.2	26.4
71	53	85.9	57,268	8,553	13,954	14.9	24.4
72	55	85.3	56,882	8,441	13,773	14.8	24.2
73	56	85.2	56,799	8,418	13,736	14.8	24.2
74	57	84.5	56,367	8,301	13,546	14.7	24.0
75	58	82.5	54,995	7,944	12,956	14.4	23.6
77	61	77.6	51,759	7,135	11,599	13.8	22.4
78	63	74.4	49,612	6,641	10,782	13.4	21.7
79	64	72.4	48,276	6,347	10,288	13.1	21.3
80	65	71.2	47,457	6,175	9,993	13.0	21.1

<sup>a</sup>Equivalent SCREEN 1 and 2 scores based on BTB mental groups.

### Selection And Predicted Loss Rates For Different SCREEN Cut Scores

The percentage selected, or selection ratio, and predicted one-year and two-year loss rates are shown in table 11 for various levels of linear SCREEN 1 and 2 cut scores. The baseline is actual CY 1973 experience, shown in the first row of the table. The table can be used in evaluating various cut score policies subject to the expected supply of recruits.

### SELECTION TEST PROBLEMS

#### AFQT History

When the draft ended in 1972, the Armed Forces Qualification Test (AFQT) that had been used to calculate mental group was discontinued. It contained items on word knowledge, arithmetic reasoning, space perception, and tool knowledge. From January 1973 through June 1974, the Navy employed short versions of the GCT, ARI, and MECH tests from the Navy Basic Test Battery (BTB) as a replacement for the AFQT. As we pointed out earlier, this Short BTB was administered by recruiters to prospective recruits, sometimes under unstandardized conditions. It resulted in a mental group distribution that showed substantially more men in group III and less in group IV compared to the mental group distribution of the same recruits on the BTB-7 administered later at Recruit Training Centers (reference 1).

The Short BTB was discarded in July 1974 when BTB-8 was put in the field for both selection and classification. Mental group continued to be calculated from the GCT, ARI, and MECH tests, but the new battery was administered by specially trained Personnelmen, not recruiters.

At the end of 1975, the BTB-8 was discontinued when DoD ordered the military services to use a common test battery, the Armed Services Vocational Aptitude Battery (ASVAB). The Word Knowledge, Arithmetic Reasoning, and Space Perception tests in the ASVAB were employed to calculate mental group.

The term "AFQT" has been applied to the tests that were used to calculate mental groups in several batteries which succeeded the original AFQT. However, these tests have not always measured the same mental abilities. The ASVAB AFQT lacks the tool knowledge items contained in the original AFQT. The Navy's BTB AFQT tests did not measure space perception and tool knowledge, but did include mechanical comprehension, which was never measured in the original AFQT.

Further, the different tests within any AFQT version are summed to calculate mental group. Thus, for example, one recruit may score highly on space perception only, another on word knowledge only, and a third on arithmetic reasoning only; but all three could easily be in the same mental group and even have the same percentile

score. Certainly the tests in the AFQT correlate with one another, but not so highly that they can be considered alternative versions of the same test of mental ability. Consequently, the meaning of the AFQT differs for recruits with different patterns of mental abilities.

#### Mental Group Changes

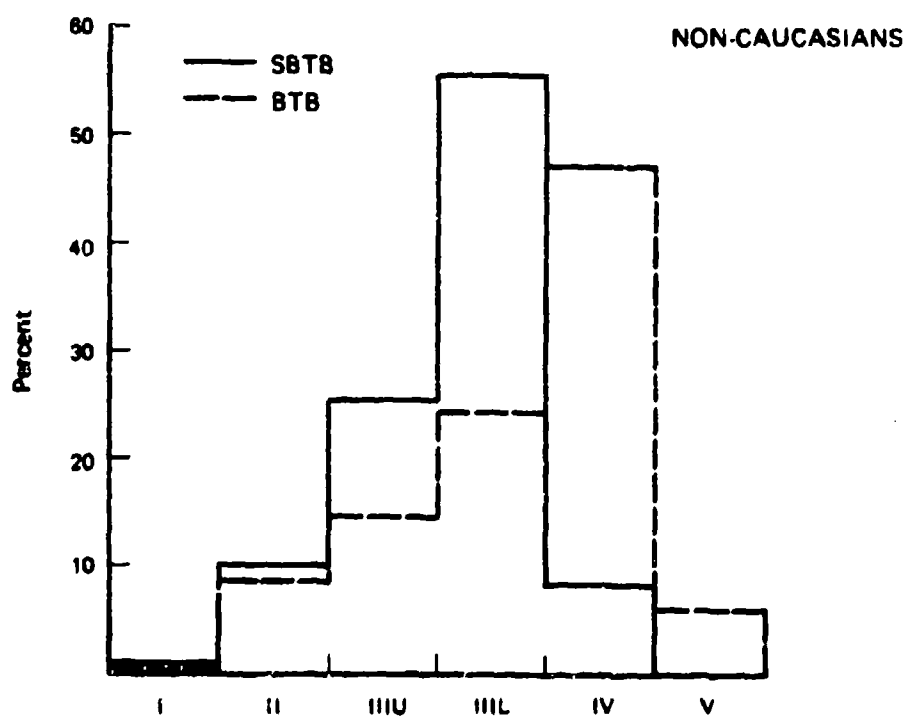
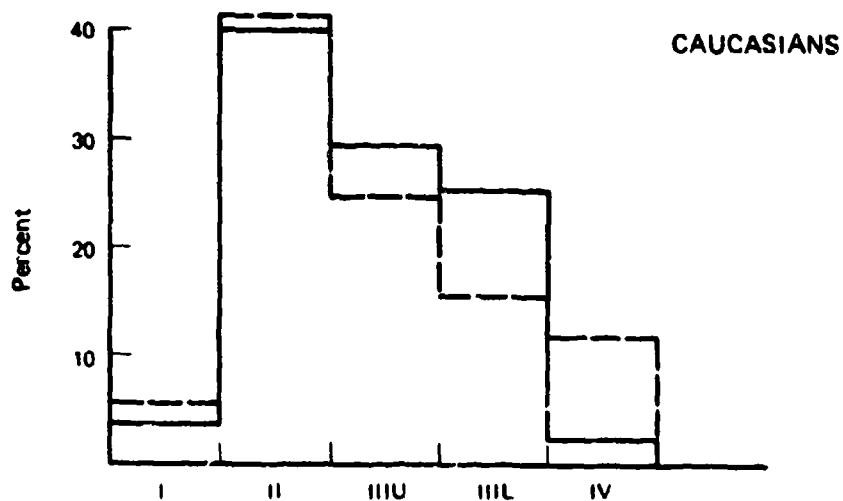
About 80 percent of the CY 1973 cohort on which SCREEN was developed had taken the SBTB prior to enlistment and the BTB during recruit training. AFQT estimates in the form of percentiles on the SBTB and Navy Standard Scores on the BTB were based on the sum of raw scores for the OCT, ARI, and MECH tests in both batteries. Both the linear and curvilinear coefficients of the correlation between these two sets of AFQT scores were .81. The true correlation would be higher because some men were denied enlistment due to AFQTs that were too low. Because their scores were not available, a correction could not be made. The important point is that a linear form was a good approximation of the relationship between the two sets of scores, and this justified predicting missing BTB-AFQT scores from SBTB-AFQT scores that were available for all men (reference 1).<sup>1</sup>

The comparative distributions of mental groups derived from both sets of scores is very interesting, since selection decisions and school guarantees were made on the basis of the SBTB scores. Here is the percentage distribution of mental groups for the two ways of calculating them, originally reported in reference 1:

<u>Mental group</u>	CY 1973 cohort AFQT basis	
	<u>SBTB</u>	<u>BTB-7</u>
I	38	48
II	36	36
IIIU	29	23
IIIL	29	19
IV	3	18
I-IIIU (school eligible)	68	63
IIIL-IV (non-school eligible)	32	37

Figure 1 shows that the change from SBTB to BTB was more dramatic for non-Caucasians, especially in the IIIL and IV mental groups. The percentages of increases and decreases from SBTB to BTB by mental group are even more revealing:

<sup>1</sup> Predicted BTB-7 G+A+M Navy Standard Score = .89 SBTB AFQT Percentile + 102.92  
for N = 54,339.



**FIG. 1: DISTRIBUTION OF MENTAL GROUPS  
BASED ON SBTB AND BTB-7**

SBTB mental group	BTB mental group					
	Caucasians			Non-Caucasians		
	% lower	% same	% higher	% lower	% same	% higher
I	27	73	-	45	55	-
II	15	77	8	42	57	1
IIIU	29	44	28	67	25	8
IIIL	33	36	31	63	27	10
IV	3	56	41	9	69	22
Total	24	56	20	58	33	9

On the average, 58 percent of the non-Caucasians fell into lower mental groups on the BTB, compared to 24 percent of Caucasians. Among the reasons for this drop are the lack of perfect correlation between the two batteries and the regression of scores toward the mean on the BTB. Motivational factors can also be involved, and test compromise and unstandardized administration of the SBTB play a part. The Caucasians had about the same percentages of mental group increases and decreases from the SBTB to the BTB, totaling 44 percent. The non-Caucasians exhibited a 58 percent decrease and only a 9 percent increase, totaling 67 percent. In other words, the mental group for 2 out of every 3 non-Caucasians changed from the SBTB to the BTB.

Now look at changes from SBTB to BTB from the perspective of school eligibility. The definition of school eligibility here is a strict one: mental group IIIU and above. (When this definition is relaxed to permit qualification on any composite of tests for any school, about 10 percent more men are eligible.) Here are the percentage figures for Caucasians and non-Caucasians:

	Hits	Percent school eligible (mental groups I, II, IIIU)			Percent not eligible on either test
		SBTB & BTB	SBTB only	BTB only	
Caucasians	82	63	10	8	19
Non-Caucasians	75	17	19	6	58
Total	81	58	11	8	23

The percentage of agreement or hits from the table above is the sum of the percentages for eligible on both SBTB and BTB and not eligible on either: 82 percent for the Caucasians and 75 percent for the non-Caucasians.



The more drastic shifts in mental groups we observed above are somewhat muted here, since only two groups are involved, school eligibles and non-school-eligibles. Recruits who qualified on the SBTB but not the BTB are the more serious errors if school guarantees have been given on the basis of their SBTB scores. These were 10 percent of the Caucasians and 19 percent of the non-Caucasians. Since not all school eligible men are sent to Class A schools, the problem may be smaller than it might appear.

In sum, the gross discrepancies in mental group measurement from using the two selection batteries - particularly in the case of non-Caucasians - were reduced in impact by aggregating men into school eligible and non-eligible categories. (Non-Caucasians do not score on average as well on the selection tests as the Caucasians (reference 3).)

The use of mental groups based on the SBTB also had an anomalous effect on the correlations of mental group with race and loss rates. Using SBTB, mental group III had the highest correlation with the race variable, and one of the highest simple and partial correlations with first- and two-year loss rates in the logit model. Using BTB, mental group IV correlated highest with race, and highly with the loss rates. The non-linearity of mental group predictions from the SBTB probably is due to the fact that the proportions of non-Caucasians in mental groups IV and V were drastically lower on the SBTB: only 8 percent compared to 53 percent on the BTB. This again suggests sizeable differences in the testing environment with the SBTB. Certainly 53 percent non-Caucasian recruits in mental groups IV and V would have been an unacceptable input under BTB testing.

Figure 1 pointed to possible differences in administration of tests for Caucasians, as well as for non-Caucasians.

#### Changing Relation of Race to Loss Rates

In the SCREEN model, race exhibits a different pattern of relationships with loss rates when mental groups based on SBTB and BTB are compared. Table 12 contains the results. With the standard five mental groups and the three-level education variable, logit regressions with the other SCREEN variables, age and dependents, produce comparable  $R^2$  values using SBTB and BTB mental groups. However, distinct differences in the significance of the race coefficient occur even though the simple correlations of race with loss rates are similar.

When mental group is based on the SBTB, the race coefficient is not significant for predicting first year losses, but it is significant for predicting higher non-Caucasian losses for the two-year period and second year period alone. In contrast, when mental group is based on the BTB, the race coefficient is significant for predicting lower first year non-Caucasian losses but not two year losses - although it is significant for predicting higher non-Caucasian second-year-only losses.

TABLE 12

RELATIONSHIPS OF RACE TO LOSS RATES FOR CY 1973 COHORT  
USING SBTB VS. BTB MENTAL GROUPS IN SCREEN

<u>Logit model</u>	<u>Race</u>			
	<u>R<sup>2</sup></u>	<u>t</u>	<u>r</u>	<u>r<sub>p</sub></u>
<u>SBTB-AFQT</u>				
1 year	.94	0.55	.13	.05
2 years	.97	5.41	.16	.42
2nd year	.94	8.90	.21	.61
 <u>BTB - AFQT</u>				
1 year	.93	-2.64	.11	-.22
2 years	.98	0.60	.15	.04
2nd year	.95	5.55	.19	.52

These differences can be attributed chiefly to the effects of using the inflated mental groups from the field administration of the SBTB vice those obtained with the administration of the BTB during recruit training. Since these tests themselves are not that different in content, it must have been the administrative conditions that differed.

Aside from the differences engendered by SBTB and BTB mental groups, when the latter are used to compare the effects of the SCREEN variables in the CY 1973 and 1974 cohorts, the significance of the race variable for predicting first year loss rates declines from the one percent to the 30 percent significance level. In the earlier case, the correlation of race with loss rate holding the other independent variables constant was -.22; in the latter case it was -.08. In both cases, the R<sup>2</sup> values were the same. Consequently, we see the effect of a change in the loss rate of non-Caucasians - principally blacks - from the first to the second year of the all-volunteer force. We have already pointed out that apparent anomalies in field testing were particularly noticeable for non-Caucasians; and that CY 1974 was a year of greatly increased recruiting quotas (30 percent more non-prior service recruits joined the regular Navy that year). Perhaps these factors led to an altered input of blacks in CY 1974, whose first-year loss experience was no longer better than that of Caucasians when education, mental group, age, and dependents were held constant.

A logit regression using second year loss rates alone for the CY 1973 cohort is shown in table 13. The coefficients of the predictors are listed in order of importance for explaining second year loss rates, and all of them are significant. The coefficient for non-Caucasians is positive, thus their loss rate is higher than that of Caucasians. In general, it is the least educated, youngest enlistees in the lowest mental group who are most likely to be prematurely discharged during this time.

TABLE 13

WEIGHTED REGRESSION RESULTS FOR LOGIT 2nd YEAR LOSS MODEL:  
93 GROUPS

Predictor	Coefficient	t	$r_p$	r
Constant	-2.282	-66.81	-	-
< 12 yrs. educ.	.724	20.86	.916	.843
Age 17	.394	11.64	.787	.623
MG IV	.270	5.96	.547	.392
Non-Caucasian	.257	5.55	.521	.202
MG II	- .193	- 4.72	-.460	-.487
> 12 yrs. educ.	- .327	- 4.52	-.445	-.319
MG III L	.174	4.04	.406	.244
MG I	- .339	- 3.62	-.369	-.230
Dependents	.176	2.74	.288	-.011
$R^2$		.951		
Standard error		.141		

The comparative second-year loss rates for Caucasian and non-Caucasian high school graduates and non-graduates in the CY 1973 cohort are given below. Recall that the non-high-school-graduate predictor (less than 12 years of education) is the most powerful one in the analysis:

		<u>1st year</u> <u>survivors</u>	<u>%</u> <u>total</u>	<u>2nd year</u> <u>losses</u>	<u>%</u> <u>total</u>	<u>2nd year</u> <u>loss rate</u>
Cauc.	HSG	37,298	67.6	3,366	46.8	9.0%
	NHS	12,205	22.1	2,813	39.2	23.0
Non-Cauc.	HSG	4,117	7.5	576	8.0	14.0
	NHS	<u>1,567</u>	<u>2.8</u>	<u>428</u>	<u>6.0</u>	27.3
Total		55,187	100.0	7,183	100.0	13.0%

Although the non-Caucasians do have a higher loss rate than the Caucasians, the striking difference is between graduates and non-graduates, regardless of race: the non-graduate loss rate is about twice that of graduates.

The lesson for selection testing from this analysis is clear: correct, careful administration is imperative to minimize test compromise, inconsistencies, misclassification to Class A schools, and controllable premature losses of men with low mental ability.

This is all the more important now that the ASVAB has replaced the BTB as the Navy's selection and classification instrument. Test compromise and unstandardized test conditions will affect AFQT scores and resultant mental groups. AFQT norm changes also will affect mental groups. The ASVAB AFQT norm of January 1976 was found to be too easy in the upper portion of the score distribution, producing a disproportionate number of recruits in mental groups I and II. It was revised in September 1976 following inter-service resolution of different norms proposed by the four services (reference 4). We will see that the revised norm now is too easy in the lower portion of the score distribution compared to the BTB AFQT norm used by the Navy during CY 1975 and in SCREEN tables.

#### CONVERSION OF ASVAB TO BTB AFQT MENTAL GROUPS IN SCREEN TABLES

##### Comparison Of ASVAB And BTB Mental Groups

Since ASVAB mental groups are used instead of BTB mental groups to determine the Success Chances of Recruits Entering the Navy, the relationship between ASVAB and BTB mental groups had to be examined in case adjustments were needed to maintain the BTB mental group basis in SCREEN. This work was accomplished by an analysis

of AFQT scores of some 1500 recruits who took the BTB-8 in late 1975 and then the ASVAB-7 after they got to Recruit Training Centers.<sup>1</sup> Roughly 700 of the recruits went to San Diego and 400 each to Great Lakes and Orlando. BTB-8 was assumed to be equivalent to the BTB-7 used in developing SCREEN.

The recruits' BTB and ASVAB Navy Standard Scores were obtained via Pers-55 for all but the ASVAB Spatial Perception (SP) test. It was unfortunate that scores on spatial perception were not furnished, because ASVAB mental group is based on the sum of raw scores on SP, WK (Word Knowledge), and AR (Arithmetic Reasoning). The problem was surmounted by predicting the SP score from its highest ASVAB correlate, the MC or Mechanical Comprehension test, using data on 2,820 Marines tested at Marine Corps Recruit Depots<sup>2</sup> (reference 5). In doing this, the WK, AR, and MC Navy Standard Scores were converted back to raw scores using the ASVAB norms introduced in January 1976. When the WK and AR raw scores were summed with the actual SP score in one case and the predicted one in the other case, the plots of the two sets of summed scores versus percentiles, shown in figure 2, were nearly congruent except at the extremes.

Appendix E contains the means, standard deviations, and correlations among the BTB and ASVAB AFQT tests and composites for the Navy sample of 1,515 recruits.

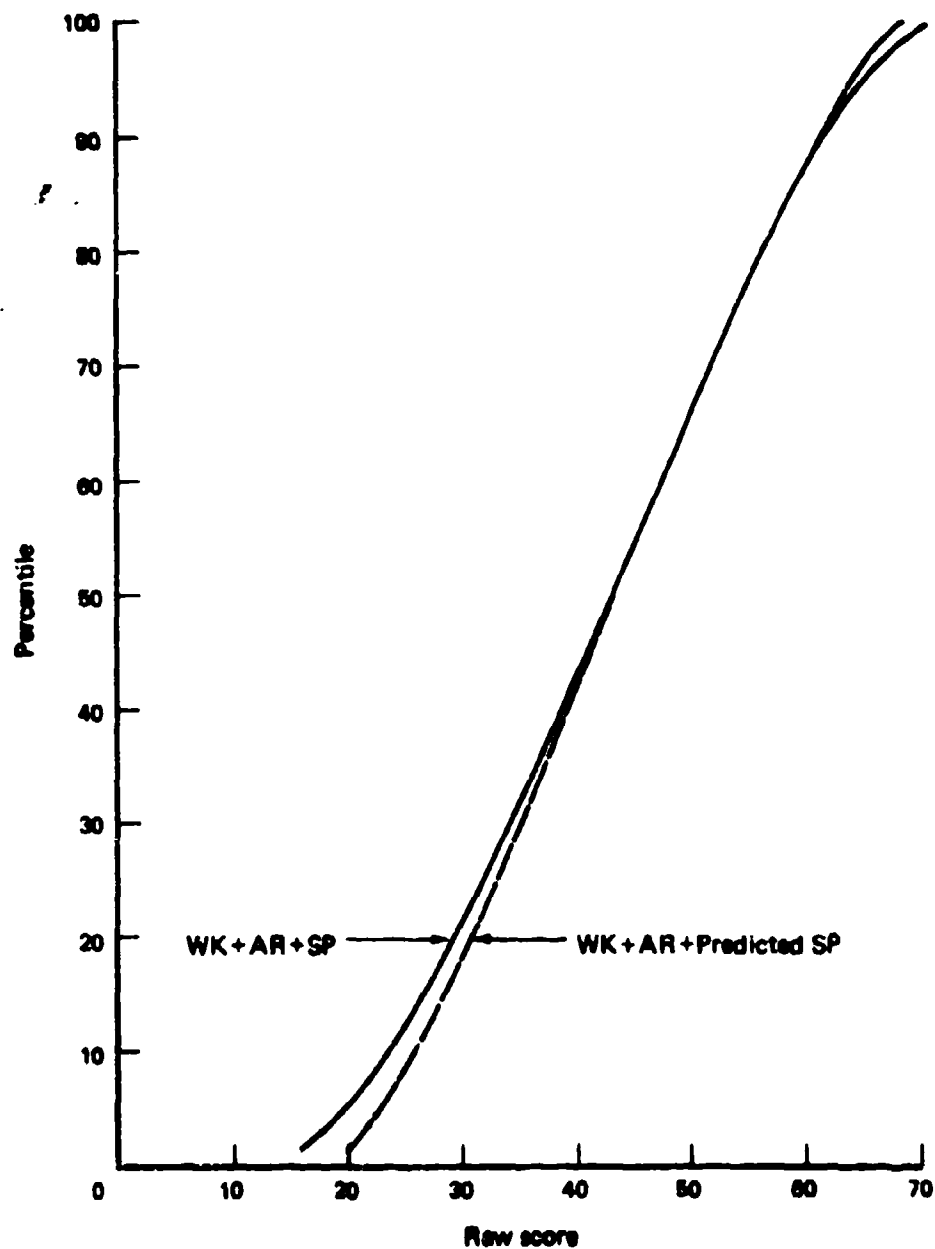
Table 14 contains the mental group cross-tabulations of BTB and the ASVAB norms of January and September 1976 for the 1,515 recruits. On the earlier ASVAB norm, nearly 53 percent of the sample had higher mental groups than they would have earned on the BTB; the figure is about 29 percent on the later ASVAB norm, due mainly to mental group III differences. Almost 89 percent of the recruits were in the upper three mental groups on the first ASVAB norm, compared to 83 percent on the current norm and 78 percent on the BTB norm.

We can estimate the effect of these norm differences on the first-year loss rates of non-prior-service male Caucasians using the mental group loss rates observed for all CY 1973 NPS male recruits in table 15. The expected first-year loss rate for the sample of 1,515 men would be 15.4 percent if the BTB AFQT norm were used, 14.3 percent if the current ASVAB norm were used, and only 12.1 percent if the earlier ASVAB norm were used.

The impact of the ASVAB norms on SCREEN cannot be ignored. Looking at it another way, we would expect a first-year loss rate 27 percent higher using the BTB

<sup>1</sup> The effects on their scores of learning, motivation, compromise, and regression toward the mean could not be evaluated.

<sup>2</sup>  $SP = .519 MC_{RS} + 7.3802$ , S.E. = 3.4037,  $r_{SP, MC} = .5244$ ,  $\overline{SP} = 13.05$ , S.D. = 3.99,  $\overline{MC} = 10.92$ , S.D. = 4.03.



**FIG. 2: ASVAB-7 AFQT DISTRIBUTIONS USING ACTUAL  
AND PREDICTED SP SCORE**

TABLE 14

## CROSS-TABULATIONS OF BTB AND ASVAB MENTAL GROUPS

ASVAB-7 Jan 1976 WK-AR-SP		BTB-R G+A+M					Total	%
		IV	IIIL	IIIU	II	I		
		134 & below	135-147	148-162	163-193	194+		
I	61 & above	0	0	9	238	57	304	20.1
II	45-60	8	99	319	412	6	844	55.7
IIIU	39-44	18	87	79	12	0	196	12.9
IIIL	31-38	25	80	33	6	0	144	9.5
IV	30 or lower	12	9	5	1	0	27	1.8
Total		63	275	445	669	63	1515	100.0
Percent		4.2	18.1	29.4	44.1	4.2	100.0	-
ASVAB vs. BTB	% lower	-	3.3	8.5	2.8	9.5	72	4.8
	% same	19.0	29.1	17.8	61.6	90.5	640	42.2
	% higher	81.0	67.6	73.7	35.6	--	803	53.0
<u>September 1976</u>								
I	64 & above	0	0	2	99	38	139	9.2
II	52-63	1	20	143	476	25	665	43.9
IIIU	42-51	11	119	236	80	0	446	29.4
IIIL	31-41	39	127	59	13	0	238	15.7
IV	30 or lower	12	9	5	1	0	27	1.8
Total		63	275	445	669	63	1515	100.0
%		4.2	18.1	29.4	44.1	4.2	100.0	--
ASVAB vs. BTB	% lower	--	3.2	14.4	14.8	39.7	191	12.7
	% same	18.8	46.2	53.0	71.2	60.3	889	58.6
	% higher	81.2	50.6	32.6	14.0	--	435	28.7

norm employed in SCREEN than when using the earlier ASVAB norm (15.4 divided by 12.1 percent). Even with the current ASVAB norm, we would expect about an 8 percent higher loss rate with the BTB norm (15.4 divided by 14.3). In practice, using SCREEN standards will lead to first-year (and subsequent) loss rates higher than expected because the ASVAB norm is easier than its BTB counterpart in SCREEN.<sup>1</sup>

TABLE 15  
COMPARATIVE MENTAL GROUP AND FIRST YEAR LOSS DISTRIBUTIONS  
FOR DIFFERENT AFQTs

Mental Group	AFQT						CY 1973 actual 1st year loss rate <sup>a</sup>
	BTB-8		ASVAB-7 Jan 1976		ASVAB-7 Sept 76		
		Cum.		Cum.		Cum.	
	%	%	%	%	%	%	
I	4.2	4.2	20.1	20.1	9.2	9.2	5.0
II	44.1	48.3	55.7	75.8	43.9	53.1	11.3
IIIU	29.4	77.7	12.9	88.7	29.4	82.5	16.1
IIIL	18.1	95.8	9.5	98.2	15.7	98.2	23.1
IV	<u>4.2</u>	100.0	<u>1.8</u>	100.0	<u>1.8</u>	100.0	31.0
Total	100.0		100.0		100.0		16.9
Predicted total 1st year loss rate	15.4		12.1		14.3		
Increase in loss rate	over 1/76	27.3%	--		18.2%		
	over 9/76	7.7%	--		--		

<sup>a</sup> Non-prior service USN male Caucasians.

<sup>1</sup> The BTB and ASVAB AFQTs have a linear correlation of .77 and a curvilinear correlation of .80 for the 1,515 recruits.



### Equating ASVAB To BTB Mental Groups

ASVAB AFQT scores were equated to the BTB AFQT scores by the following process: The G+A+M Navy Standard Score was observed for every fifth percentile from 5 to 95 in the "Conversion Table for BTB-8 AFQT" in the Navy Recruiting Manual (see columns 1 and 2 in table 16). These Navy Standard Scores were marked off on the sample score distribution. Then the smoothed cumulative frequencies below each of them was recorded (column 3, table 16), and the ASVAB AFQT cumulative frequency closest to them was found (column 4, table 16). Next, the WK+AR+SP raw score at each of these cumulative frequencies was observed (column 5, table 16). Finally, these raw scores were entered in the "AFQT Conversion ASVAB Form 6 and 7" in the recruiting manual for the norms used from January through August 1976 and from September 1976 to date. The percentiles for these norms are shown in column 6 of table 16.

Since mental group is the most important aggregation of the percentile scores, both for reporting to DoD and in SCREEN, the percentile scores at mental group limits are shown at the bottom of table 16. Notice that both ASVAB norms are easier than the BTB norm. For example, the lower limit of mental group II is the 65th percentile on the BTB AFQT, the 80th percentile on the January ASVAB AFQT, and the 67th percentile on the September ASVAB AFQT norm. Differences between the BTB and the two ASVAB AFQT versions are illustrated in figure 3.

To convert ASVAB AFQT to a BTB basis in SCREEN tables, the mental group Roman numerals should be replaced by the ASVAB AFQT percentiles given below in table 17. This conversion cannot, however, offset the effects of testing irregularities or test compromise. Rigidly controlled, standardized testing conditions are necessary to minimize testing irregularities. Properly constructed alternative AFQT test forms administered by scrupulous, trained administrators are the only way to minimize test compromise.

### Predicting Survival Rates For Recruit Quality Categories

The recruit quality categories used by the Navy are defined as follows:

	<u>High school graduate</u>	<u>Non-high school graduate</u>
School eligible (MG I - IIIU)	A	B
Non-school eligible (MG III & IV)	C	D

The predicted chances of surviving the first year of service for these quality categories will differ depending on whether BTB or ASVAB mental groups are used in defining them. If the BTB standard recommended in this report is implemented, then the "BTB Mental Group basis" in table 18 applies. If the ASVAB mental groups reported by the AFES

TABLE 16

EQUATING OF ASVAB-7 TO BTB-8 AFQT PERCENTILES  
(N = 1,515)

(1) Percentiles	(2) AFQT from BTB-8		(3) Smoothed cumulative frequency below NSS		(4) AFQT from ASVAB-7		(5) Raw score at smoothed cumulative frequency		(6) Percentile for ASVAB-7 RS	
	G+A+M Navy Std. Score				Closest smoothed cumulative frequency				Jan 76	Sept 76
95	197		1470		1465		65		97	94
90	189		1394		1377		63		95	91
85	182		1265		1269		61		93	86
80	177		1162		1148		59		89	80
75	172		1043		1028		57		87	75
70	167		907		905		55		84	71
65	163		787		794		53		80	67
60	158		642		659		50		75	62
55	154		527		503		47		69	56
50	149		374		370		44		64	52
45	145		262		261		42		60	49
40	141		174		169		38		48	45
35	137		96		100		35		42	39
30	134		58		53		32		33	33
25	129		24		22		29		21	25
20	124		10		11		27		18	19
15	117		3		3		23		9	10
10	104		0		0		--		--	--
Mental group lower limit										
I 93	194		1455		1465		65		97	94
II 65	163		787		794		53		80	67
IIIU 49	148		340		330		43		62	50
IIIL 31 (32)	135		66		65		33		36	35
IV 10 <sup>a</sup>	104		--		--		--		--	--
21 <sup>a</sup>	125		13		11		27		18	19

<sup>a</sup>Minimum for enlistment.

are used, then the "ASVAB Mental Group basis" in table 18 is appropriate. Both sets of chances were calculated for the CY 1973 recruit cohort. The BTB basis was reported in reference 1, while the ASVAB basis is contained in appendix F.

TABLE 17

ASVAB AFQT PERCENTILES EQUIVALENT TO BTB MENTAL GROUPS

<u>Mental group</u>	<u>Equivalent ASVAB-6/7 AFQT percentile on Sept. 1976 conversion table</u>
I	94-99
II	67-93
IIIU	50-66
IIIL	35-49
IV	21-34 <sup>a</sup>

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<sup>a</sup>21 is the minimum for enlistment.

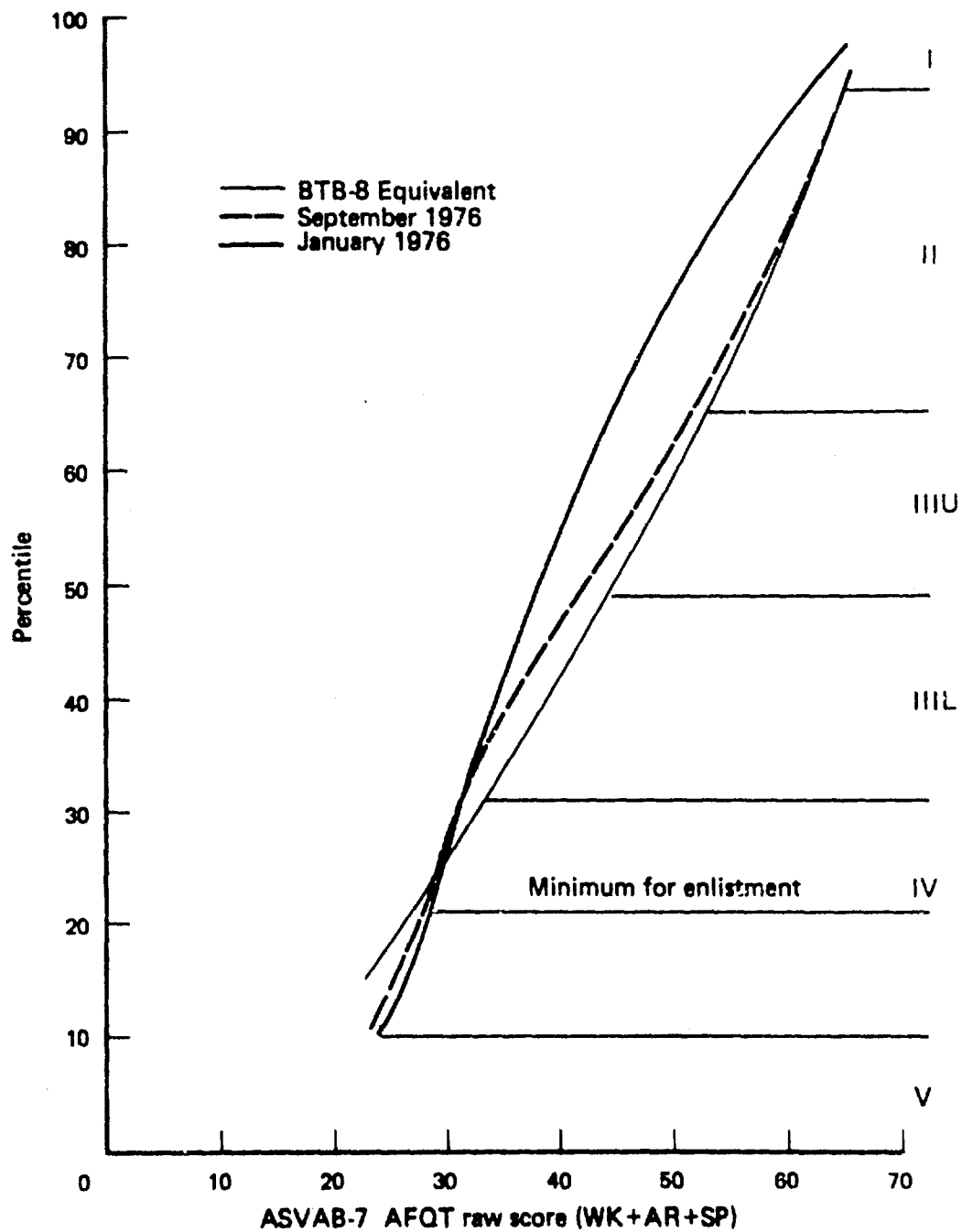


FIG. 3: BTB-8 AND ASVAB-7 AFQT CONVERSION RELATIONS  
(N=1, 515)

TABLE 18

PREDICTED FIRST YEAR SUCCESS CHANCES FOR RECRUIT QUALITY  
CATEGORIES BASED ON BTB AND ASVAB MENTAL GROUPS

<u>Quality category</u>	<u>BTB Mental Group basis<sup>a</sup></u>		<u>ASVAB Mental Group basis</u>	
	<u>Caucasians</u>	<u>Non-Caucasians</u>	<u>Caucasian</u>	<u>Non-Caucasian</u>
A	89.6	91.6	89.3	90.3
B	76.8	79.7	75.5	77.9
C	80.2	82.3	80.3	82.0
D	68.2	70.7	67.9	70.2
A+B	87.3	89.4	86.5	87.6
A+B+C	86.0	84.6	85.6	84.2
A+B+C+D	83.2	80.7	83.2	80.7

<sup>a</sup>From table 14 in reference 1.

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1. Center for Naval Analyses, Study 1068, "Chances of Surviving the First Year of Service," by R.F. Lockman, Unclassified, Nov 1975
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4. Center for Naval Analyses, Memorandum (CNA) 76-3091.10, "An Examination of the Normalization of the Armed Forces Vocational Aptitude Test (ASVAB) Forms 6 and 7," R.L. Kohn and W.H. Sims, Unclassified, 25 Feb 1977
5. Center for Naval Analyses, Memorandum (CNA) 76-3103, "A Comparison of Correlations Between the ASVAB 6/7 and ACB-61 Classification Tests," by W.H. Sims and R.L. Kohn, Unclassified, 18 Aug 1976
6. Center for Naval Analyses, Memorandum (CNA) 76-0569 "Comparisons of Years of Education and Degree for CY 1973 QUEBECS," by R. F. Lockman, Unclassified, 26 Mar 1976

APPENDIX A

CY 1973 AND CY 1974 COHORT COMPARATIVE DATA

TABLE A-1

## CY 1974 INPUT AND FIRST YEAR LOSS DATA FOR CAUCASIAN RECRUITS\*

Mental Group	Age	More Than		12 Years of Education		12 Years of Education		Less Than	
		12 Years of Education	Dependents	No	Dependents	No	Dependents	12 Years of Education	Dependents
I	15-19	4.7	0.0	1,281	5.1	5.0	3.3	50.0	
	20+	171	4	1,281	5.3	40	30	2	
	17	537	120	374	6.8	141	11.1	0.0	
II	18-19	8.3	9.1	10,742	9.9	12.6	21.5	35.1	
	20+	521	22	10,742	13.9	405	1,206	94	
	17	1,485	286	2,671	12.2	847	250	103	
III U	18-19	6.1	0.0	5,958	12.4	24.4	27.9	30.2	
	20+	114	6	5,958	17.6	209	1,901	139	
	17	339	49	1,394	15.2	366	336	168	
III L	18-19	17.0	0.0	100.0	15.0	29.0	34.1	45.2	
	20+	47	2	3,821	19.9	138	2,349	188	
	17	124	30	983	19.7	201	415	186	
IV	18-19	9.1	0.0	3,472	23.6	38.5	39.5	46.6	
	20+	22	0	3,472	32.4	91	2,835	251	
	17	88	8	1,186	26.9	193	535	250	
		0.0	0.0	619	6	33.3	40.9	56.0	
		0	0			6	4,970	86	

\*Actual loss rate  
Number of recruits



TABLE A-2

## CY 1974 INPUT AND FIRST YEAR LOSS DATA FOR NON-CAUCASIAN RECRUITS\*

Mental Group	Age	More Than		12 Years of Education		12 Years of Education		Less Than	
		No	Dependents	No	Dependents	No	Dependents	No	Dependents
I	18-19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20+	3	1	18	0	0	0	0	0
	17	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0
II	18-19	9.7	0.0	9.5	15.4	33.3	0.0	33.3	0.0
	20+	31	1	328	13	51	1	51	1
	17	0.0	0.0	11.1	15.2	54.5	25.0	54.5	25.0
III U	18-19	158	34	162	38	11	4	11	4
	20+	0.0	0.0	8.6	0.0	30.9	50.0	30.9	50.0
	17	2	0	93	1	55	2	55	2
III L	18-19	17.9	0.0	12.6	27.8	39.3	50.0	39.3	50.0
	20+	28	0	485	18	168	10	168	10
	17	0.0	0.0	21.9	25.4	42.0	47.1	42.0	47.1
IV	18-19	18.2	100.0	18.5	36.8	65.2	65.2	65.2	65.2
	20+	22	1	848	19	439	23	439	23
	17	0.0	0.0	24.0	26.0	49.3	28.6	49.3	28.6
V	18-19	17.1	14.3	392	77	150	28	150	28
	20+	123	21	17.3	100.0	41.5	40.0	41.5	40.0
	17	0.0	0	196	1	468	5	468	5
VI	18-19	17.1	0.0	18.8	28.2	34.4	34.8	34.4	34.8
	20+	41	0	2,085	71	1,141	46	1,141	46
	17	0.0	0.0	23.8	23.4	34.9	39.1	34.9	39.1
VII	18-19	15.2	36.0	1,009	167	361	64	361	64
	20+	151	25	16.3	0.0	37.2	50.0	37.2	50.0
	17	0.0	0	393	1	973	6	973	6

\*ACTUAL LOSS RATE  
Number of recruits

TABLE A-3

## CY 1973 INPUT AND FIRST YEAR LOSS DATA FOR CAUCASIAN RECRUITS\*

Marital group	Age	More than 12 years of education		12 years of education		Less than 12 years of education	
		No dependents	Dependents	No dependents	Dependents	No dependents	Dependents
I	18-19	(11.2) 3.8 182	(5.0) 0 6	(4.3) 4.4 1,279	(8.0) 11.3 52	(15.4) 11.5 28	(18.1) 0 1
	20+	(14.4) 4.3 552	(8.2) 8.3 103	(7.5) 6.2 273	(11.2) 8.0 53	(18.5) 18.7 6	(22.4) 0 4
	17	(12.7) 0 1	(8.5) 0 0	(5.8) 3.7 272	(8.5) 50.0 2	(18.8) 21.7 23	(20.8) 100 2
II	18-19	(8.1) 7.9 300	(8.9) 13.2 38	(8.2) 8.9 11,553	(13.0) 14.3 505	(20.3) 18.3 935	(24.1) 15.5 71
	20+	(9.4) 8.6 1,774	(13.1) 8.8 291	(12.4) 13.9 1,931	(18.2) 16.2 551	(23.5) 20.2 114	(27.3) 27.3 55
	17	(7.8) 0 4	(11.4) 0 0	(10.7) 12.8 2,936	(14.5) 12.0 50	(21.8) 20.1 1,601	(25.8) 21.4 42
III	18-19	(8.5) 11.1 180	(12.8) 12.8 8	(11.9) 11.7 8,186	(15.8) 18.7 239	(23.0) 22.3 1,374	(28.7) 32.8 137
	20+	(12.0) 12.8 380	(15.8) 18.7 51	(15.1) 13.9 834	(18.8) 21.3 225	(26.2) 25.9 162	(30.0) 43.4 76
	17	(10.3) 0 0	(14.0) 0 0	(13.3) 13.3 1,811	(17.1) 21.4 28	(24.4) 23.5 2,779	(28.2) 28.4 67
IV	18-19	(14.0) 7.8 64	(17.8) 0 2	(17.1) 15.5 3,528	(20.8) 26.4 129	(28.2) 27.8 1,449	(31.9) 40.8 138
	20+	(17.2) 18.4 128	(21.8) 18.8 16	(20.3) 20.8 806	(24.1) 21.8 119	(31.4) 38.5 159	(35.2) 46.8 79
	17	(15.5) 0 1	(19.3) 0 0	(18.6) 18.8 1,049	(22.3) 34.8 23	(29.7) 29.7 3,085	(33.4) 34.0 53
V	18-19	(18.8) 10.7 28	(22.8) 0 0	(21.9) 22.2 2,109	(25.7) 38.6 70	(33.0) 38.6 1,414	(38.8) 49.8 103
	20+	(22.0) 25.4 89	(25.8) 50.0 2	(25.1) 28.8 510	(28.9) 37.5 72	(36.2) 45.0 202	(40.0) 33.3 72
	17	(20.3) 0 0	(24.1) 0 0	(23.4) 27.2 514	(27.2) 21.4 14	(34.1) 33.2 2,688	(38.3) 34.8 52

\*Civ: (Predicted loss rate) Actual loss rate  
Number of recruits

Source: reference 1.

TABLE A-4

## CY 1973 INPUT AND FIRST YEAR LOSS DATA FOR NON-CAUCASIAN RECRUITS\*

Mental group	Age	More than 12 years of education		12 years of education		Less than 12 years of education	
		No dependents	Dependents	No dependents	Dependents	No dependents	Dependents
I	18-19	(0) 0	(1.6) 0	(0.9) 0	(4.8) 0	(12.0) 0	(15.7) 0
		3	0	3	1	0	0
	20+	(1.0) 0	(4.8) 0	(4.1) 0	(7.9) 0	(15.2) 0	(19.0) 0
II		7	0	3	1	0	0
	17	(0) 0	(3.1) 0	(2.3) 0	(6.1) 0	(13.4) 0	(17.2) 0
		0	0	0	0	0	0
III	18-19	(2.7) 11.8	(6.5) 0	(5.2) 7.0	(9.8) 9.1	(16.9) 4.2	(20.7) 86.7
		17	2	227	11	24	3
	20+	(6.0) 6.1	(9.7) 9.3	(9.0) 15.2	(12.2) 4.0	(20.1) 11.1	(23.9) 0
IIIU		82	24	65	25	9	0
	17	(4.2) 0	(8.0) 0	(7.3) 6.3	(11.1) 0	(18.4) 28.6	(22.2) 0
		0	0	63	0	21	0
IIIL	18-19	(5.4) 6.7	(9.2) 0	(8.4) 8.0	(12.2) 31.3	(19.5) 27.2	(23.3) 33.3
		30	1	402	16	92	3
	20+	(8.6) 12.7	(12.4) 10.5	(11.7) 14.4	(15.4) 22.8	(22.8) 30.0	(26.5) 14.3
IV		71	19	116	31	20	7
	17	(6.9) 0	(10.6) 0	(9.9) 9.5	(13.7) 0	(21.0) 30.2	(24.8) 0
		0	0	105	1	126	5
IV	18-19	(10.6) 18.6	(14.4) 0	(13.7) 18.7	(17.4) 19.2	(24.8) 37.5	(28.5) 43.8
		32	0	697	26	251	16
	20+	(13.8) 6.5	(17.6) 3.4	(16.9) 20.4	(20.7) 22.6	(28.0) 35.9	(31.8) 64.3
IV		107	29	196	31	64	14
	17	(12.1) 0	(15.8) 0	(15.1) 17.3	(18.9) 0	(26.2) 33.2	(30.0) 50.0
		0	0	202	2	279	6
IV	18-19	(15.4) 22.7	(19.2) 0	(18.4) 15.6	(22.3) 13.9	(29.6) 33.2	(33.4) 28.0
		22	2	1,267	36	584	25
	20+	(18.6) 14.4	(22.4) 21.4	(21.7) 20.6	(25.4) 28.6	(32.8) 30.1	(36.6) 40.0
IV		104	14	403	70	143	30
	17	(16.9) 0	(20.7) 0	(20.0) 17.0	(23.8) 0	(31.1) 27.9	(34.9) 18.7
		0	0	276	3	602	6

\*Key: (Predicted loss rate) Actual loss rate  
Number of recruits

Source: reference 1.

## APPENDIX B

### LOSS MODEL SPECIFICATION

## APPENDIX B

### LOSS MODEL SPECIFICATION

The loss model hypothesized that the probability of separation during the first year of service for the  $i$ th group of male recruits,  $P_i$ , was a function of:

LT12ED	-	less than 12 years of education
*12ED	-	12 years of education
GT12ED	-	more than 12 years of education
MGI	-	mental group percentiles 93 and above
MGII	-	mental group percentiles 65 to 92
*MGIII	-	mental group percentiles 49 to 64
MGIIIL	-	mental group percentiles 31 to 48
MGIV	-	mental group percentiles 30 and below
AGE 17	-	17 years old
*AGE 18-19	-	ages 18 and 19
AGE 20 +	-	age 20 or older
*MAJ	-	racial majority
MIN	-	racial minority
PDEPS	-	primary dependents (wife, children)
*NDEPS	-	no primary dependents

Then

$$P_i = \alpha + \sum_{j=1}^k \beta_j X_{ij} + U_i$$

where  $\alpha$  is an intercept that subsumes one dummy variable of each set (starred in the list above),  $U_i$  is the error term, the  $\beta_j$ s represent the coefficients to be estimated, and the  $X$ s are the dummy variables (not starred in the list above). Using these variables, and estimates of  $\alpha$  and the  $\beta$ s found by multiple regression analysis in the model, we were able to predict the probability,  $P_i$ , of any individual (with a given set of characteristics) being lost during the first year of service.

For simplicity, we first assumed the linear functional form given above. But since the loss rate is a number lying between 0 and 1, we also estimated regressions using a logit transformation of the dependent variable:<sup>1</sup>

$$\ln \left( \frac{P_i}{1-P_i} \right) = \alpha^1 + \sum_{j=1}^k \beta_j X_{ij} + z_i$$

where  $\ln$  indicates the natural logarithm, the  $X_i$ s are the independent variables from (2) above, and  $z_i$  is the error term.

Weighted ordinary least squares regressions for the linear and logit specifications were run. The weights for the groups were, respectively,  $\sqrt{n/pq}$  and  $\sqrt{npq}$ , where  $n$  is the number of recruits in a group,  $p$  is the proportion of losses, and  $q$  is the proportion of survivors.<sup>1</sup> Where there were no recruits for a particular combination of independent variables, that combination was ignored. Where  $P_i = 0$ , the loss rate was taken as  $1/2n_i$ . Where  $P_i = 1$ , the rate was taken as  $1-1/2n_i$ .<sup>2</sup>

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<sup>1</sup> Gray, B.C., "Supply of First Term Military Enlistees," in Studies Prepared for the President's Commission on an All-Volunteer Armed Force, U.S. Government Printing Office, November 1970

<sup>2</sup> Berkson, J., "Maximum Likelihood and Minimum Chi-square Estimates of the Logistic Function," Journal of the American Statistical Association, March 1955, pp. 130-162

**APPENDIX C**

**YEARS OF EDUCATION AND GED SUCCESS CHANCES**

## APPENDIX C

### YEARS OF EDUCATION AND GED SUCCESS CHANCES

In developing SCREEN, years of education was chosen as the measure of civilian educational accomplishment rather than degree, diploma, or the lack of educational credentials. The reason for this was that "degree" data was missing or coded improperly for 40 percent of the CY 1973 cohort, for which Navy Recruiting Command program analysis figures showed about 27 percent non-high-school-graduates. The percentage of men in the cohort with less than 12 years of education was 28 percent, so this, and the completeness of the data on years of education, dictated its choice as the measure of educational level. There are possible problems even with this figure, particularly if years of school attendance rather than grade completion are recorded. The effect of this practice would mildly inflate the measure (reference 6).

However, Navy recruitment planners had a special interest in the loss experience of men with General Educational Development (GED) high school equivalencies, about 7 percent of the CY 1973 cohort. For these GEDs, table C-1 shows actual and SCREEN success rates by mental group and age. There were too few minorities and men with dependents to permit stable rates to be calculated for them, so they were pooled with the other men. Likewise, there were so few men in Mental Group I that they were pooled with those in Mental Group II.

The actual first-year success rates for GEDs cluster closely around their average of 82, except in Mental Group IV where they are considerably lower. This 82 percent average does not compare favorably with the 93 percent average for men with high school diplomas but is better than the 69 percent average of non-graduates. SCREEN rates for recruits with 12 years of education and dependents are those closest to the actual GED rates. The biggest difference between the actual and SCREEN rates occurs for men in Mental Group IV who are 20 or older. There were only 60 men in this category, and none of them would qualify for enlistment under prior or SCREEN standards.

GED two-year success rates average 8 percentage points less than the cohort average of 72 percent and fall midway between those for men with 12 years of education who have dependents and those for men with less than 12 years who do not have dependents.

It is interesting to note that 51 percent of the GEDs were 17 years old when they enlisted, compared with the only 28 percent 17 year-olds in the 1973 cohort as a whole. Looking at success rates by age alone, 17 year-olds have the poorest one- and two-year records.

Consequently, the acceptance of GED high school equivalency in lieu of a high school diploma resulted in admitting recruits whose success chances by the end of the second



year of service were inferior to those of the cohort average. There were at least three reasons for this: reduced standards in 1973 for qualification on the GED; the inability of the GED to measure the motivation that is involved in completing high school as well as a first enlistment; and the fact that a majority of GED recruits were only 17 years old, the most loss prone age group. Nevertheless, GED recruits still have better success chances than recruits who have not completed high school.

TABLE C-1

CY 1973 GED SUCCESS RATES

Mental group	Age at ADBD	% of GED accessions	First-year success rate		Second year success rate	
			Actual	SCREEN <sup>a</sup>	Actual	SCREEN <sup>b</sup>
II	17	19	83	85	65	69
	18 & 19	18	85	87	70	74
	20+	5	87	84	74	70
IIIU	17	15	82	83	61	64
	18 & 19	10	85	84	70	69
	20+	3	85	81	62	65
IIIL	17	10	80	78	57	57
	18 & 19	7	83	79	65	63
	20+	2	85	76	60	58
IV	17	7	76	73	52	52
	18 & 19	4	73	74	51	57
	20+	1 (46 men)	65	71	45	53

<sup>a</sup> Rates for men with the same mental group and age, but with 12 years of education and dependents.

<sup>b</sup> Rates midway between 12 years/deps. & <12 years/no deps; take no MG IVs.

**APPENDIX D**

**CY 1973 COHORT TWO-YEAR DATA**

TABLE D-1

## CY 1973 COHORT TWO-YEAR DATA\*

Years Of Education	Age	No Dependents							
		I	II	III U	III L	IV			
>12	17	100.0	75.0	100.0	100.0	100.0	1	100.0	0
	18	92.3	88.5	88.5	100.0	100.0	13	50.0	4
	19	92.5	85.1	83.7	78.3	78.3	83	78.3	46
	20	91.8	85.8	81.8	78.3	78.3	235	74.2	163
12	17	89.7	78.6	74.5	67.0	67.0	1251	60.4	790
	18	89.7	84.4	81.1	75.3	75.3	2681	69.5	1930
	19	86.6	83.2	80.5	73.7	73.7	1545	70.1	1446
	20	86.2	78.1	77.2	70.4	70.4	802	66.8	913
<12	17	69.6	63.7	57.7	51.6	51.6	3345	47.9	3221
	18	70.0	69.3	63.3	55.9	55.9	1368	49.2	1475
	19	66.7	70.0	62.2	55.8	55.8	432	47.6	523
	20	66.7	64.2	61.5	49.8	49.8	223	47.5	545

\*Actual success rate and number of recruits

TABLE D-2

## CY 1973 COHORT TWO-YEAR DATA\*

Years Of Education	Age	Dependents							
		I	II	III U		III L		IV	
	17	100.0	0	100.0	0	100.0	0	100.0	0
	18	100.0	0	100.0	0	100.0	1	100.0	0
	19	100.0	6	86.8	38	100.0	1	100.0	2
>12	20	86.4	103	84.1	315	81.4	70	82.2	45
	17	50.0	2	80.0	50	65.5	29	60.0	25
	18	88.9	27	82.2	241	72.7	110	67.1	70
12	19	80.6	36	78.9	275	66.9	145	63.5	85
	20	88.1	84	77.1	576	66.4	256	64.7	150
	17	0.0	2	59.5	42	52.8	72	50.8	59
	18	100.0	0	73.7	38	53.8	78	51.6	91
<12	19	100.0	1	52.8	36	53.2	62	49.2	63
	20	75.0	4	50.9	55	50.6	83	39.8	93
								46.6	58
								40.3	67
								34.4	61
								52.9	102

\*Actual success rate and number of recruits

**APPENDIX E**  
**SAMPLE CORRELATIONS AMONG AFQT**  
**TESTS AND COMPOSITES**

TABLE E-1

SAMPLE CORRELATIONS, MEANS, AND STANDARD DEVIATIONS OF  
BTB-8 AND ASVAB-7 AFQT TESTS AND COMPOSITES  
(N = 1,515)

	<u>G</u>	<u>A</u>	<u>M</u>	<u>WK</u>	<u>AR</u>	<u>SP</u>	<u>G+A</u>	<u>WK+AR</u>	<u>G+A+M</u>	<u>WK+AR+SP</u>	<u>Mean</u>	<u>S.D.</u>
G	-	.62	.34	.75	.58	.50	.91	.77	.85	.78	56.4	8.3
A		-	.27	.47	.70	.41	.89	.64	.81	.64	53.5	7.8
M			-	.23	.29	.58	.34	.29	.67	.37	52.3	7.5
WK				-	.54	.45	.68	.92	.63	.90	22.8	5.6
AR					-	.53	.71	.83	.67	.83	14.5	3.9
SP						-	.51	.55	.63	.68	14.2	1.9 <sup>a</sup>
G+A							-	.78	.92	.79	109.8	14.5
WK+AR								-	.73	.99	37.3	8.4
G+A+M									-	.77 <sup>b</sup>	162.2	18.4
WK+AR+SP										-	51.5	9.6

<sup>a</sup>Using the formula  $\sigma_{SP} = \frac{\sigma_{\hat{SP}}}{r_{MC,SP}}$ ,  $\sigma_{SP} = \frac{1.9}{.52} = 3.6$

<sup>b</sup>Curvilinear correlation coefficient (Eta) = .80.

Notes: All coefficients significant at  $\leq .01$  level.

G, A, and M are in Navy Standard Score form; WK, AR, and SP are in raw score form.

**APPENDIX F**

**CY 1973 COHORT DATA WITH ASVAB MENTAL GROUPS**

TABLE F-1

CY 1973 INPUT AND FIRST YEAR LOSS DATA BY  
QUALITY CATEGORY BASED ON ASVAB MENTAL GROUPS

Quality Category	Caucasian			Non-Caucasian				
	Input	\$ Input	% loss	Input	\$ Input	% loss		
A	35,474	59.7	3,881	10.9	1,644	23.1	170	10.3
B	8,910	15.0	2,133	23.9	461	6.5	131	28.4
C	7,149	12.0	1,446	20.2	3,204	44.9	561	17.5
D	8,019	13.5	2,594	32.3	1,819	25.5	582	32.0
Total	59,592	100.1	10,054	16.9	7,120	100.0	1,444	20.3



TABLE F-2

CY 1973 WEIGHTED REGRESSION RESULTS FOR LINEAR AND LOGIT  
FIRST YEAR LOSS MODELS USING ASVAB MENTAL GROUPS

Explanatory variable	Linear			Logit		
	Coefficient	t	r <sub>p</sub>	Coefficient	t	r <sub>p</sub>
Constant	.130	31.09	--	-1.880	-57.69	--
<12 yrs. educ.	.115	20.21	.865	.713	21.32	.877
MG I	-.090	-13.02	-.744	-1.079	-9.06	-.612
MG IV	.089	11.81	.710	.515	12.32	.725
MG II	-.037	-7.83	-.556	-.330	-8.54	-.590
Age 20+	.032	5.63	.433	.279	6.33	.475
MG III L	.037	5.56	.429	.247	5.92	.452
>12 yrs. educ.	-.031	-4.64	-.369	-.334	-4.63	-.368
Dependents	.038	4.46	.356	.385	6.79	.502
Non-Caucasian	-.030	-4.43	-.354	-.104	-2.27	-.191
Age 17	.015	2.99	.248	.096	2.80	.233
R <sup>2</sup>		.927			.925	
Standard Error		.022			.172	